



**Managing the Unmanageable – Implementing Work Force Planning using
EVPM methodology in a public hospital environment**

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Also, Raf Dua for his work with in conjunction with the author in developing the Micro Planner project plans and earned value reporting in the original research and for being my Dad.

Earned Value Performance Management techniques were first introduced in the late 1960's by the US Department of Defence and in Australia in 1986 for defence projects. It is beginning to spread outside the defence arena and the use of EVPM for a trial at the Latrobe Regional Hospital when it was privately managed in 1999 – 2000 was probably a first in the healthcare industry. (The results of this trial was previously presented at the 5th IRNOP conference in Holland in June 2002, by the author)

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New Australian Standard for EVPM AS 4817 - 2003

In February 2003, the Australian Standard for Earned Value Performance Measurement was published after a three year gestation period. The standard was published as AS4817 -2003 and is named Project Performance Measurement using Earned Value. The research carried out during the preparation of this paper was bench marked against this standard.

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No estimate is more in danger of erroneous calculations than those by which a man computes the force of his own genius.

- Samuel Johnson

Abstract

All over the world the public hospital system is faced with the common problem of managing a tight or shrinking budget whilst maintaining existing services and having to provide additional ones: in other words trying to “Manage the Unmanageable”.

One of the major issues within the public health system is the shortage of skilled nurses as well as surgeons. Managing the workload within all departments especially the operating theatres is a complex and difficult issue. By utilising workforce planning techniques coupled with Earned Value Performance Measurement helps ensure that case lists are managed effectively.

Workforce planning has many definitions. For purposes of this paper, I have adopted the following common definition:

Workforce planning is a systematic process for identifying the human capital required meeting hospital goals and developing the strategies to meet these requirements.

Workforce planning involves:

- *A systematic process* that is integrated, methodical, and ongoing.
- *Identifying the human capital required to meet hospital goals*, which consists of determining the number and skills of needed staff and where and when they will be needed.
- *Developing the strategies to meet these requirements*, which involves identifying actions that must be taken to attract (and retain) the number and types of staff the hospital needs.

In other words, effective workforce planning through the use of Critical Path methodology is a continuous process that ensures an agency has the right number of people in the right jobs at the right time.

The paper will describe how EVPM has been developed in a major rural public hospital to enable management to “Manage the Unmanageable”

Introduction

“Nothing is more difficult, and therefore more precious, than to be able to decide”

Napoleon Bonaparte

The new Victorian Public Regional Hospital (in the Australian state of Victoria) is an amalgamation of the Traralgon and Moe Hospitals and The Hobson Park Psychiatric Facility. It is a 257 bed facility comprising of medical, surgical, maternity, aged care and psychiatric services. It was built in 1997 – 98.

The Operating Suite consists of 4 operating rooms, anaesthetic set up rooms, Day Surgery Facility, Sterile Services and a recovery suite; it is staffed with a full time equivalent of 46 people, generally between 8500 - 9000 procedures per annum are carried out. Previous work using EVPM techniques showed that detailed analysis of utilisation, clinical processes and layout of the theatres at the then new hospital would facilitate the implementation of efficiencies, previously not attained in the public hospital system. It improved throughput and enhanced patient access to the theatre facilities and that those methods could be easily applied to any hospital, whether or not it was public or private.

The surgical specialities that the hospital covers are

- Orthopaedics
- General Surgery
- Ear Nose and Throat Surgery
- Plastic
- Endoscopy
- Diagnostic Thoracic
- Gynaecology and Obstetrics
- Urology
- Paediatrics

Scope of Work

Each month between 650 and 800 procedures are performed within the operating theatre complex. Theatre utilisation fluctuates between 90 to 100% depending on surgeon and anaesthetist availability. Of course operating theatres are not immune to all the usual office type of lack of resources at any point of time, eg, Annual leave, sick leave, conferences, meetings and the day to day management and staff crises. However unlike a normal office environment which carries on regardless of shortages of resource, the Operating Theatre cannot perform procedures if a particular resource is unavailable. This may lead to the cancellation of the procedure at the very worst or a delay at the very best. Back filling sessions can be depending on the notice given, close to 100%, i.e. if a surgeon gives leave details in a reasonably timely manner, then his/her sessions can be offered to other specialists and impact of these changes is measured through our EVPM system.

Variations such as sudden patient cancellation due to no shows or to illness as well as emergencies cannot be planned in advance. In the cases of no presentation or patient illness (eg influenza), a waiting list is utilised to fast track other patients waiting for elective surgery.

Certain boundaries exist for this type of management of waiting lists, this includes the availability of human resources and equipment, and these are the physical necessities. The second issue is the budget or WIES system which is an essential financial consideration. (For more information on how I manage WIES, refer to “Using EVPM Techniques in Theatre Management of WIES (DRG’s) and Healthcare Projects”, a paper jointly presented with Raf Dua at IRNOP V in Holland in 2002). If WIES or patient episodes do not meet target, funding is reduced in the next financial year, if WIES is over target the hospital is not funded for the excess in the existing financial year. This is where EVPM techniques play such a crucial role in my being able to manage the WIES Estimate To Complete successfully.

Another key area in the planning of the workforce is the staff mix with the appropriate qualified skills. To comply with the ACORN standards in Australia, resource planning is imperative to service delivery.

Three registered nurses (RN’s) are required to staff each operating theatre per session, in the event of sick leave or any other type of absenteeism of nursing staff, technicians, strategies are in place to be implemented to maintain service delivery. Failure to manage and plan these issues may well cause the cancellation of the session and thereby cause budgetary problems as well as all the other downstream management issues.

Thus the delicate balance that takes place each day to ensure that the necessary and may be specific skilled resources are available as well as ensuring the required outcomes are achieved takes up a great deal of my time as well as the need to continually monitor the EV indicators as well as Resource Plans and Schedules.

The anticipated outcomes I need to manage are to allow for

- Minimisation of waiting lists
- Increased theatre throughput
 - Real time production of session lists
 - Real time production of Staffing Rosters
 - Real time data capture
- Reduced unnecessary overheads (by improved procedure planning and scheduling)
 - Improved tracking and control of consumables
 - Reduction in recovery times
- Improved infection control procedures to reduce theatre cleaning time and infection rates.

- Reduced need for future increased theatre capacity. Delay need for further theatre capacity.
- Improved VMO satisfaction and staff relationships
- More efficient case mix formulation
- Enhanced workflows, theatre layout and work practices
- Definition of Key Performance Deliverables
 - Definition of Key Performance Indicators
- The ability to produce an annual WIES budget utilising the typical procedures performed annually

The use of critical path network methods provides an essential tool in rapidly managing the unmanageable. At the start of the budget year a project plan is developed using generic case lists which I know from past experience are very likely to occur. I also take into account the fact that approximately fifteen percent of the workload is emergencies. The project plan is managed around the allocated WIES budget (Raf Dua and I have previously presented papers on this aspect of WIES and EVPM). I use EVPM to provide me as a manager with the Budget at Completion (BAC) of my allocated WIES at the beginning of the year and then to provide me with my Estimate to Complete of WIES.

To establish the model certain data elements that need to be collected and these are shown in Appendix 1

The Workforce Planning Model

A model covering an entire year's workload is developed using a critical path network, each procedure on the list is denoted by a simple critical path task. Each task is allocated the expected WIES points, the speciality of the surgeons, number of OR unit staff required for the procedure; which after analysis will have the attributes of a schedule start and finish time as well as the required resources taken into account. Having specified the anticipated WIES value for the procedures the resulting S-curve is of great benefit to me for tracking actuals against the planned case load. Plus it is a simple matter to produce a schedule of all the procedures planned for any time period selected. Figure 1 below shows a part of the model that was developed.

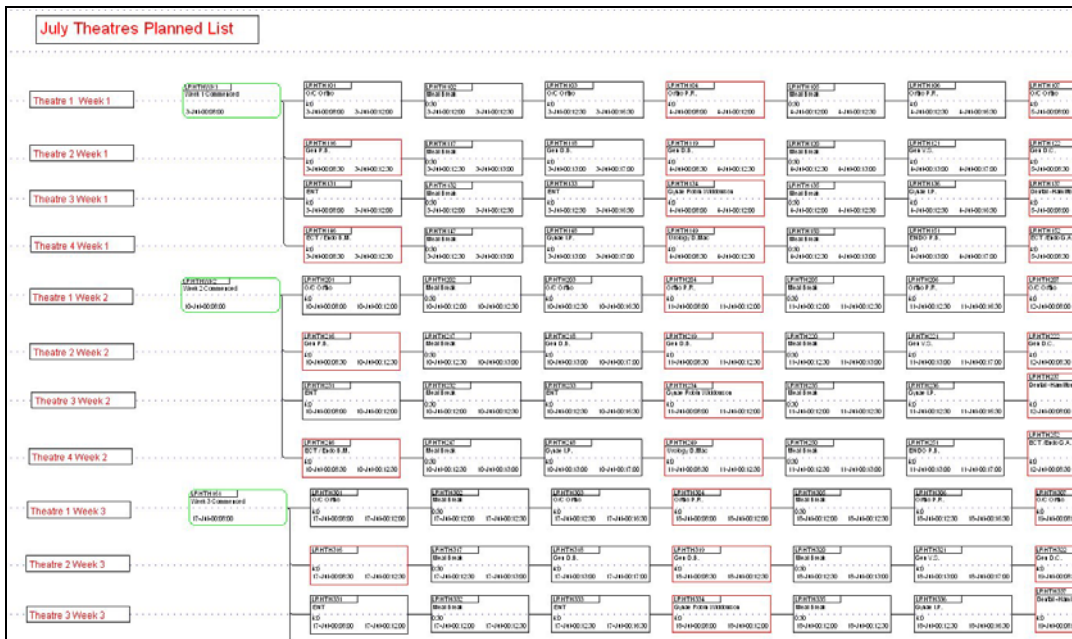


Figure 1 – Theatre Case List Critical Path

Having analysed all the schedule data, the results are archived and the WIES are accumulated to produce the baseline performance schedule. This is shown as an S-curve as illustrated in Figure 2.

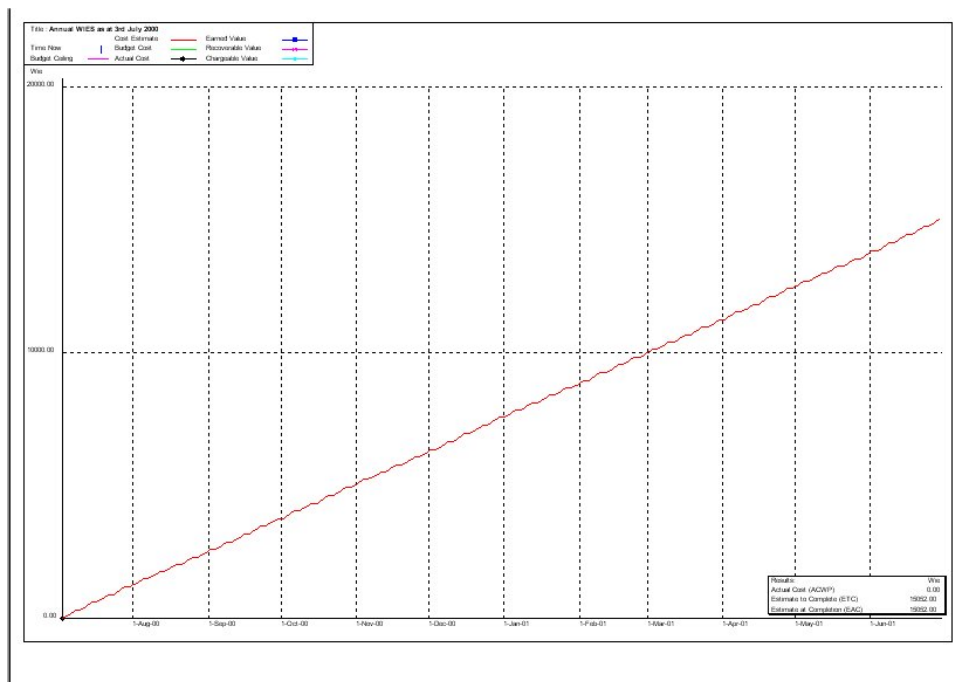


Figure 2 – WIES Performance Baseline

After each day's theatre sessions have been completed, the theatre clerk inputs the actual procedures completed and re-runs the schedule.

If the sessions did not perform according to schedule, then the outstanding work will be rescheduled and the total performance baseline re-rolled.

If the actual work carried out was exactly as planned then the theatre will “earn” the number of WIES points it should have. As time passes the Budget baseline and the Actual curves may move away from each other if the theatre is not performing the planned procedures, or if it is then the curves will be equal. Figure 3 shows the progressed WIES curve

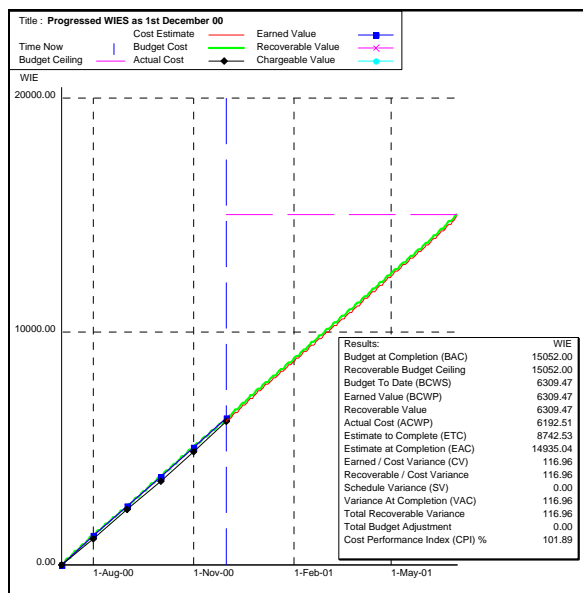


Figure 3 Progress WIES Performance Curve

The Unmanageable

Unmanageable situations present themselves in a myriad of ways from not having sufficient resources due to illness, equipment failure, emergency surgery, late patient cancellation to surgeons not being available; delay in stock delivery, eg special prostheses. Being able to maintain the balance of the workforce who have various and or specific specialist skills is a continuing challenge, which is also made more difficult within the political, current budget and WIES system. Using the project plan and earned value allows me to make effective and well balanced decisions when changes occur and so manage the unmanageable.

Benefits of Earned Value

- Increased surgical throughput of 4%, these increases have been gained through better staff management, standardisation of procedure set ups, sterile consumable bundles and more efficient usage of anaesthetic set up rooms.
- Increased Session availability of 5%, through more efficient rostering of skill mix, surgical consultant availability and extremely tight management practices adopted by the Peri operative Services Unit Manager.
- Decrease in sessions unused by 8%, again due to management of sessions, and an early warning process put in place to alert management of any sessional allocation problems.

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- Decrease in GOR man hours of 25%, which also equates to a decrease in overtime hours of 24%, increased efficiency still allows for a 4% increase in throughput.
- Decrease of 15% of nursing time spent on clerical duties through the introduction of a computerised prosthetic register.

Appendix 1 - Data set definition

In order to support the Project Data Model for implementing the Earned Value System, the original research team established a series of data definitions. This y involved a review of best practice models from both Australia and international publications and data sets. Due to the large number of variables that can be specified, we defined a minimum data set in order to provide input for the EV System. The full data set will be available for further analysis in later stages of the project. The minimum data set consists of some 17 elements, namely

1. Anaesthesia start
2. Patient arrival in room
3. Procedure / Surgery Start time
4. Procedure / Surgery Finish time
5. Patient leaving room
6. Patient care activity rate (in-hours)
7. Patient care activity rate (total hours)
8. Surgical activity rate (in-hours)
9. Surgical activity rate (total hours)
10. Room occupancy (in-hours)
11. Room occupancy (total hours)
12. Theatre throughput (in-hours)
13. Theatre throughput (Total hours)
14. Procedure Duration
15. Procedure Type of Duration
16. Procedure Type
17. Staffing levels
 - RN's
 - Technicians
 - Surgical/Medical
 - Environmental services
 - CSSD

Clinical Statistics Collected

Sun	SUB	Mon	Tue	Wed	Thu	Fri	Sat	Sun	SUB	Mon	Tue	Wed	Thu	Fri	Sat	Sun	SUB	Mon	Tue	Wed	Thu	Fri	Sat	Sun	SUB	Mon	Tue	Wed	Thu	Fri	Sat	Sun	SUB	Mon	Tue	Wed	Thu	Fri	Sat	Sun	SUB	GRAND	TOTAL					
0	1	0	0	0	3	0			3	1	1	0	2				4	0	1	2	0	1			4	0	1	1	0	0											2	14						
0	0	0	0	5	4	13			22	5	5	9	7				26	0	6	6	7	0			19	0	5	7	7	7												26	93					
0	5	3	0	0	0	0			3	0	0	0	0				0	5	0	0	0	0			5	3	0	0	0	3													6	19				
0	3	3	0	0	0	0			3	0	0	0	0				0	0	0	0	0	0			0	3	0	0	0	6													9	15				
0	0	2	2	4	6	3		1	18	1	3	1	2	3			10	4	3	4	1	2	1	1	16	2	1	2	5	2	1	1												14	58			
0	7	0	4	3	4	2			13	4	4	4	2				14	1	3	1	4	0			9	3	3	4	4	6														20	63			
0	0	1	3	2	5	1			12	1	2	2	3	1			9	1	0	5	2	2			10	4	2	3	2	1		2												14	45			
0	5	0	8	1	0	2			11	5	3	1	2				11	2	4	0	3	3			12	1	7	0	4	3															15	54		
0	3	2	0	2	0	3			7	0	3	0	3				6	3	0	2	0	3			8	3	0	4	0	5															12	36		
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6	11	4	4	2	2	3		5	20	2	5	2	5	4		5	23	3	3	2	2	5	1	2	18	6	2	3	6	4		2													23	95		
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0	0	0	0	0	0	0			0	0	0	0	0				0	0	0	0	0	2			2	0	0	0	0	0																0	2	
0	0	0	1	0	1	0			2	0	0	1	0				1	0	0	0	1	0			1	0	0	0	2	0																2	6	
0	0	0	5	0	4	0			9	0	0	4	0				4	0	5	0	4	0			9	0	4	0	0	0																4	26	
0	0	0	0	0	0	0			0	0	0	0	0				0	0	0	0	0	0			0	0	0	0	0	0																0	0	
0	0	0	0	5	0	0			5	0	5	0	0				5	0	0	7	0	0			7	0	0	6	0	0																6	23	
0	0	0	0	0	0	0			0	0	0	0	0				0	0	0	0	0	0			0	0	0	0	0	0																0	0	
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0	0	0	0	0	0	0			0	0	0	0	0				0	0	0	0	0	0			0	0	0	0	0	0																	0	0
0	0	0	0	0	0	0			0	0	0	0	0				0	0	0	0	1	0			1	0		0	0	0																0	1	
6	41	17	32	25	35	34		0	6	149	4	28	27	33	33	0	5	130	22	26	41	31	25	2	3	150	28	26	32	32	42	1	5										166	636				

Figure 4 -Base Theatre Statistics

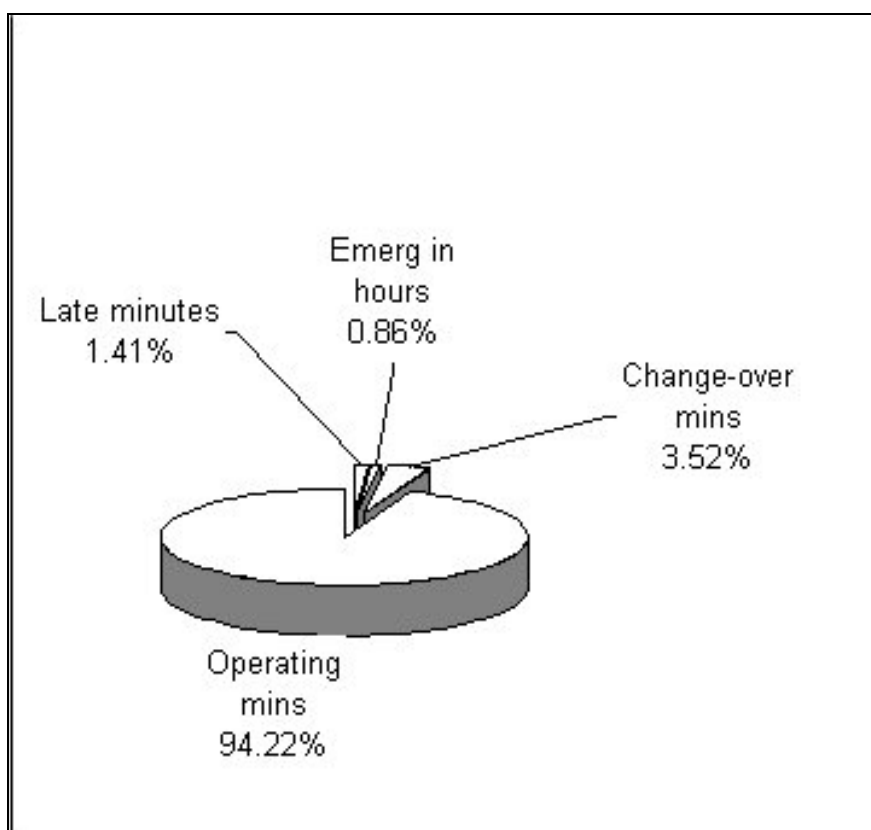


Figure 5 Theatre Usage Time

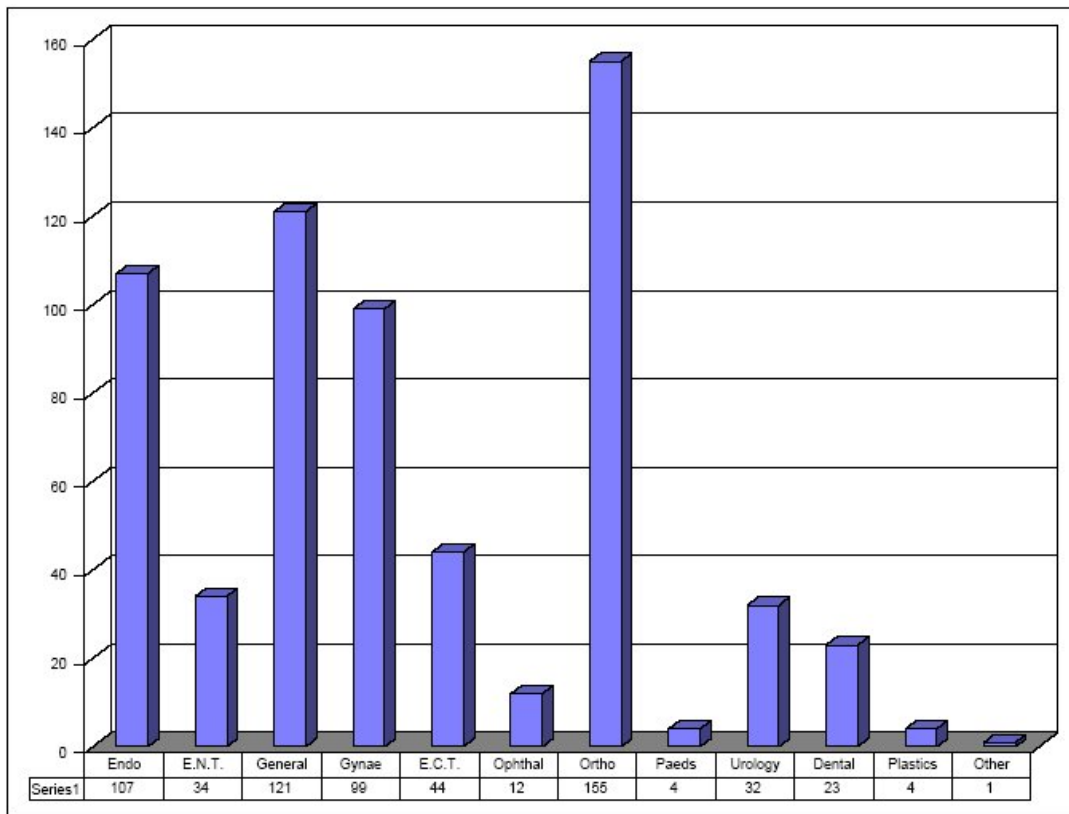


Figure 6 – Number of Procedures in a month

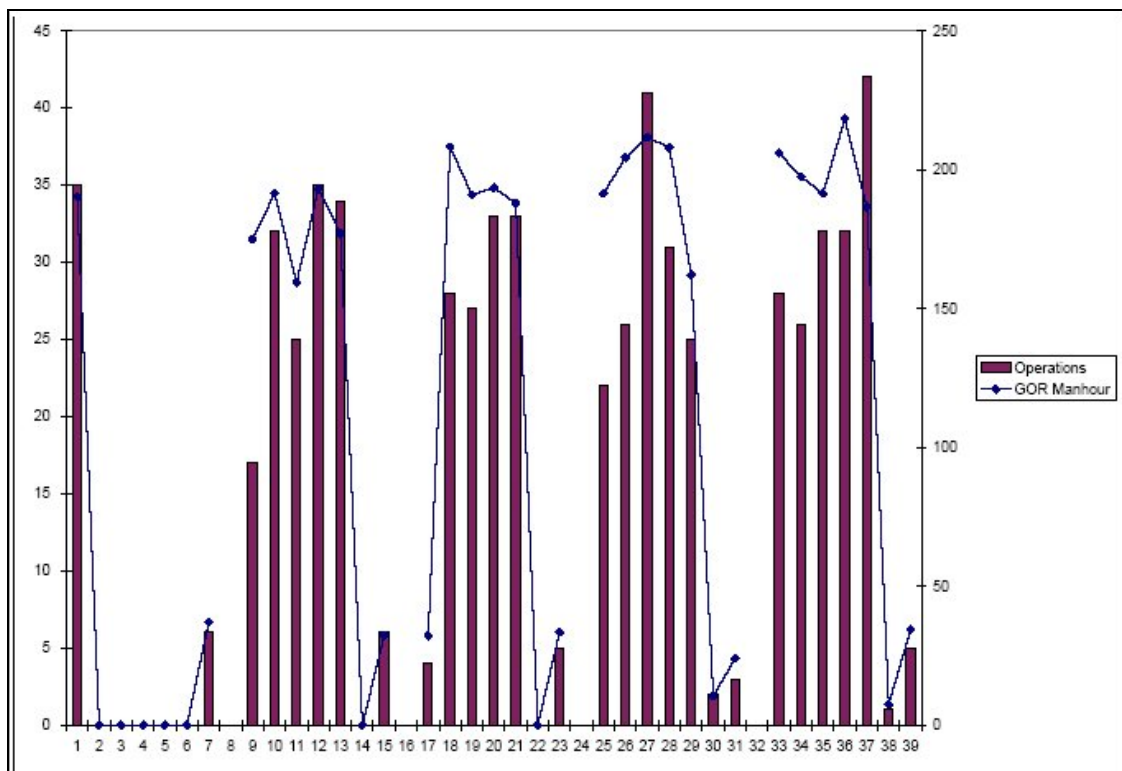


Figure 7 - Number of procedures per day

Appendix 2

Reference Material Used During Research

1. AS 4817 – 2003 Project performance measurement using Earned Value
2. MIL-Std-881A, Work Breakdown Structure for Defence Material Items, April 25,1973
3. AS 2443 - Glossary of Terms for Network Planning in the Building & Construction Industry 1981
4. Project Management – The Common Sense Approach by Lee Lambert PMP and Erin Lambert MBA - 2000
5. Sage A P & White E B, Methodologies for Risk and Hazard Assessment, IEEE
6. Risk Analysis for Large Projects, Models, Methods & Cases, Dale Cooper & Chris Chapman, John Wiley & Sons, 1987.
7. Def (AUST) 5655 – Australian Cost Schedule Control Systems Criteria
8. Def (AUST) 5657 – Australian Cost Schedule Control Systems Criteria; Implementation Guide (ACSIG)
9. Def (AUST) 5658 – Cost Schedule Status Reporting (CSSR) Specification and Implementation Guide
10. Def (AUST) 5664 – Work Breakdown Structures for Defence Materiel projects – Policy and Guidance
11. Human Resource Management in Construction Project – Strategic and Operational Approaches by Martin Loosemore, Andrew Dainty and Helen Lingard, 2003
12. Project Management Planning & Control Techniques (3rd Edition) by Rory Burke – 1999
13. Using EVPM Techniques in Theatre Management of WIES (DRG's) and Healthcare Projects,- Raphael M. Dua and Ms Kathryn James – IRNOP V - 2002

Notes :- To find out more about EVPM methods and other useful links visit <http://www.microplanning.com.au/evpm.asp>